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Preface

Mathematics is the oldest of all sciences. Its foundations are visible in mathematical texts originating in the ancient Egyptian, Mesopotamian, Indian, Chinese, Greek and Islamic worlds.

Since the very beginning, when mathematics was conceived for fulfilling very basic needs like numbering, counting and measuring simple-shaped areas, this discipline has evolved in a boisterous way thus producing significant results that have strongly marked the evolution of mankind.

Through the centuries, mathematical ideas and achievements have been organized and shaped into fundamental branches like arithmetic, number theory, algebra, geometry, and trigonometry, as well as related sciences like astronomy, mechanics and physics.

The development of the discipline then bloomed in the 16th century, when mathematical innovations started to interact with new scientific discoveries; and its growth has never ceased thereafter.

Nowadays, mathematics is the most influential and pervasive of all sciences in our society, because of its exclusive potential of establishing connections among virtually all possible manifestation of our knowledge. As a matter of fact, it is used throughout the world as an essential tool in many fields. In particular, applied mathematics transfers mathematical knowledge into other fields, offering new possibilities to manage the growing complexity of our real world.

Beautiful though they may be, mathematical results are not merely museum-pieces, but form a vital underpinning for every branch of quantitative knowledge, including all domains of science and engineering. Mathematics is in constant and vigorous development, driven both by its internal dynamics and by the demands of other disciplines, henceforth impacting the whole of our daily life.

By gathering different contributions from several world-famous scientists from mathematics and related sciences, this book highlights the way mathematics deeply permeates and fertilizes our society.

In particular, here will we face the role of mathematics in applied sciences showing results in different fields in industry, environment, life sciences and architecture.

This book has the ambition to excite the readers interest showing how mathematics is also hidden in the natural world around us, independently of mankind presence and interference: there are maths schemes in any prey-predator interaction, Boltzmanns equations hidden in clouds, Navier-Stokes Equations concealed in a waterfall, free boundary problems to be solved in a melting iceberg.

Though this work will face maths problems that are not always elementary, yet it is not intended for mathematicians only. The rigorous, nonetheless readable, exposition, the intriguing examples, the stimulating demonstrations of the deep connections among science, technology, architecture, human sciences and mathematics will fascinate even those who, not being scientists or experts of this discipline, have always felt attracted by the noblest and most fundamental of modern sciences.

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